

Work Order ID 54504



Page 1

December 10, 2009 11:52:03 AM

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

D212-664-101

Item Name: Crosstube Fwd

Stop



Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: *PL*Date: *09/07/10*

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-141	Rev D

100 0.00

DOCUMENT CONTROL

DC
Document Control

Memo 0.00

Photocopy bluefile and create labels as per PPP D212-664-101 CHG003

*6/10/09**PL for B6 10/01/07*

110 0.00

Packaging
Packaging

Memo 0.00

10-1-8 10 SP

120 0.00

BENDING MACHINE - CROSSTUBES
CNC Bend 2
CNC Alpha 160 Bender

Memo 0.00

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

OK MB 09-12-16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng/ Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 54504

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Revision ID:

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Item Name: Crosstube Fwd

Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Quality Control

Memo

0.00

CP 09-12-16

140

Crosstubes

0.00

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

NB 540
09-12-17

AWN 9-12-09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Work Order ID 54504



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December 10, 2009 11:52:04 AM

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 12/28/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID
150Operation
Description
Crosstubes Chemical ConversionSet Up/
Run Hours
0.00Draw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

AU 19-12-09

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

160

QC5- Inspect part completeness to step on W/O

0.00

QC

Memo

0.00

Quality Control

170

Outsource process - NDT per QSI038 4.1

0.00

Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038
 Issue P/O: 11012
 LPI as per ASTM 1417 Level 2
 Attach copy of NDT results to work order

CD 10/10/09 (1)

10/12/09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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December 10, 2009 11:52:04 AM

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Revision ID:

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Item Name: Crosstube Fwd

Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180



Receive & Inspect for Damage & Mat'l Certs

0.00

10/10/09

Packaging

Packaging

Memo

0.00

Ensure copy of NDT results attached to work order.

190



QC5- Inspect part completeness to step on W/O

0.00

ml 10 01 04 01

QC

Quality Control

Memo

0.00

Inspect for damage & ensure results are as per Dwg D212-664-141

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200



Spray Painting per QSI005 4.2

0.00

m/ 10 01 05-0

SprayPaint

Spray Painting

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2
2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 8:30Finish Time: 9:30

PAINT:

Start Time: 2:30Finish Time: 3:30

210



QC14- Inspect Spray Paint

0.00

ZT 10 - 01 - 06

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start
	QC:	Date:	SPC (Y/N):	Date:	Stop	

Run Start



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220	Crosstubes	0.00							
	Memo	0.00							
Crosstubes	1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 2-Install supports with magnobond as per QSI 015 Adhere for 12 Hrs A/R 6398 Magnobond Batch: 112417 exp 01/2011 <i>Torque: ml 10/01/07 ①</i>								
230	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									
240	Pick Kit	0.00							
Packaging	Memo	0.00							
Packaging									

10-18 RE SF

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 54504

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December 10, 2009 11:52:04 AM

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Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 10/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 28/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run Start
	QC:	Date:	SPC (Y/N):	Date:	Stop

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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250 QC4- 100% Inspect kits for completeness

0.00

250



QC

Quality Control

Memo

→ S colors

260



Packaging

0.00

Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPP D212-664-101

270



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

Page 1

December 10, 2009 11:52:07 AM

Work Order ID: 54504



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 10/12/2009

Required Date: 28/12/2009

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Item ID/ Item ID	Replacement Item ID	Mfg/ Purch	Bin	Primary Item	Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
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D212-664-101TRN



Manufactured

No

110

Each

3.0000

1.0000



0-54407

MB 09-12-16

Crosstube Turning Detail

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

FG

3

53256

1

54281

1

54284

1

D3595-063-450



Manufactured

No

230

Each

188.9689 4.2105



RUBBER CUSHION

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

LG

84

52447

84

Main Warehouse

ST

104.9689

38959

2

43210

2.59

46465

0.3789

53775

100

ML 10/01/06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

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December 10, 2009 11:52:07 AM

Work Order ID: 54504



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 10/12/2009

Required Date: 28/12/2009

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-25		Purchased	No			220	Each	201.0000	4.0000			

Clamp(per MIL-DTL-8783C)

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

ST	201	
107456	2	
108111	3	
108975	17	
109181	42	
109644	10	
111282	4	
111429	1	
<u>112495</u>	22	
112919	25	
113281	25	
113282	50	

10/01/06

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Picklist Print

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Work Order ID: 54504



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Parent Item Name: Crosstube Fwd

Start Date: 10/12/2009

Required Date: 28/12/2009

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D2893-1 2.75 Support		Manufactured	No			220	Each	71.0000	2.0000			

WarehouseLocation

Main Warehouse

ST	71
25657	6
47109	2
<u>47637</u>	15
51775	19
53125	19
53340	10

WL 10/01/06

D3428-1

Placard

Manufactured No

240

Each

11.0000



10-1-8

R/S

WarehouseLocation

Main Warehouse

ST096	11
50790	11



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

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December 10, 2009 11:52:07 AM

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Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 10/12/2009

Required Date: 28/12/2009

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item Name	Item ID/ Item ID	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-35A BOLT			Purchased	No			240	Each	58.0000	4.0000		10-1-8	SJ

WarehouseLocation

Main Warehouse

ST
 112314
 112805

Loc QtyLoc Code

58

38

20

4

AN6-36A
Bolt

Purchased No

240

Each

123.0000

4.0000

WarehouseLocation

Main Warehouse

ST
 109632
 110382
 112314
 113121

Loc QtyLoc Code

123

1

2

70

50

4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Parent Item Name: Crosstube Fwd

Start Date: 10/12/2009

Required Date: 28/12/2009

Comments: IPP RevH: as per ECN09-696 09.11.19 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item Name	Item ID/ Item ID	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L6			Purchased	No			240	Each	500.0000	6.0000		10-1-8	S

Nut

Warehouse	Loc Qty	Loc Code
Location		

Main Warehouse

ST	500	
105077	22	
110002	5	
111548	8	
111578	400	
112492	65	

AN960JD616

Purchased No

240 Each 787.0000 18.0000



10-1-8

S

Washer

Warehouse	Loc Qty	Loc Code
Location		

Main Warehouse

ST	787	
112314	3	
112828	484	
113149	300	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

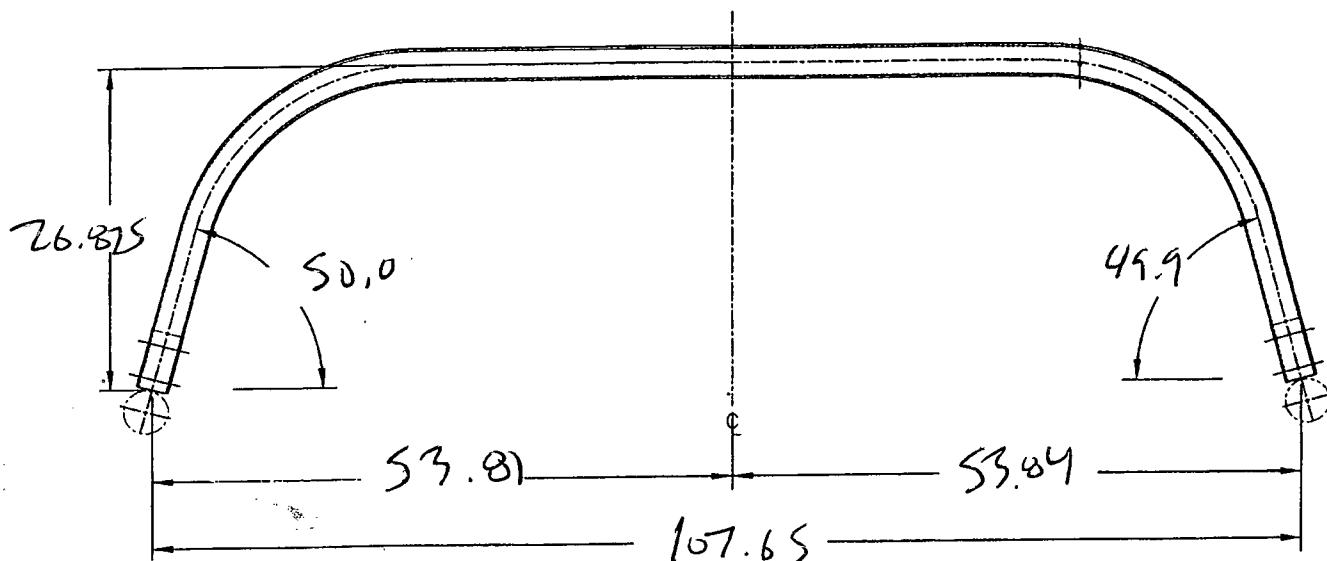
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	54504
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments
~0.1" cut from bottom of tube to RMV heavy chamber. Dims represent cut dims, cut pt indicated 107.615 09.12.16

QC15 Inspection	<i>DP</i>
Date	09.12.16

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	<i>JK</i>
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	<i>JM</i>

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

D

Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS
6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE
SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR
DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND
MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT
HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 54504
POL 09-10-10

RELEASED
2009-10-09
M

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	Q	DRAWING NO. D212-664-141	REV. D SHEET 1 OF 4
MFG. APPR.	DA		
APPROVED	ND	TITLE XTUBE ASS'Y (205/212/412 HI FWD)	SCALE NTS
DE APPR.	-		
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

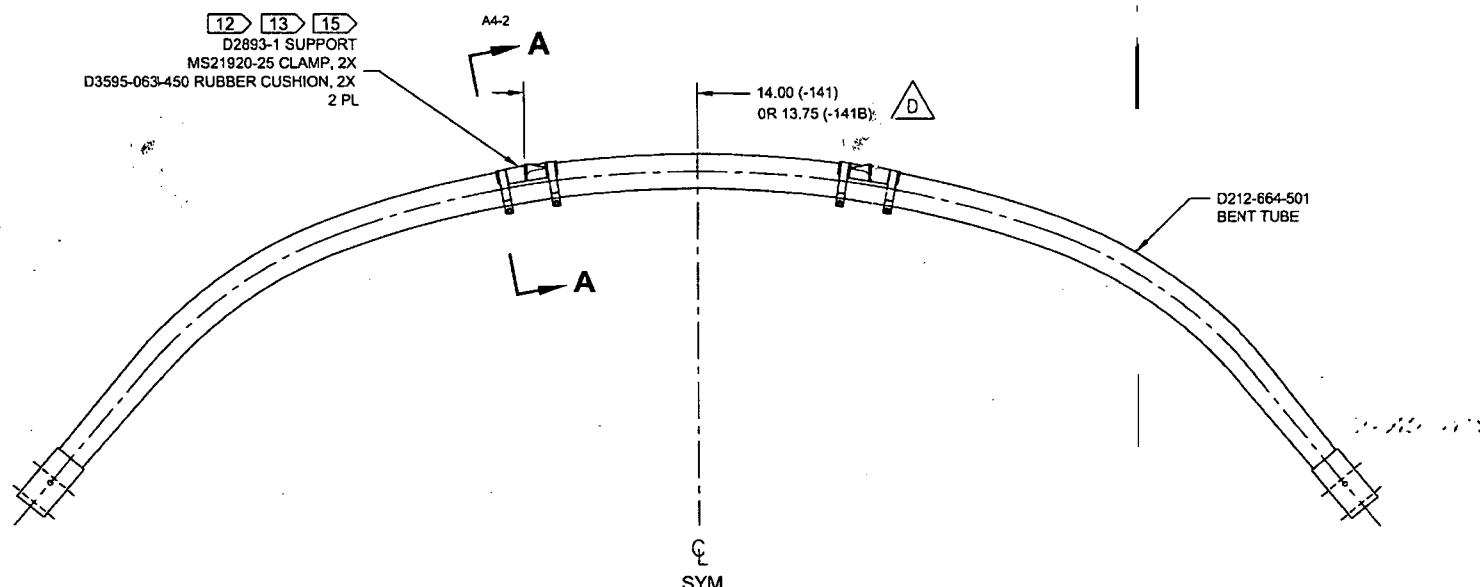
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

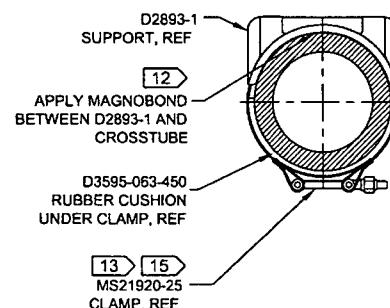
NOTE: Date & initial all entries

8 7 6 5 4 3 2 1



D212-664-141/-141B
ASSEMBLY DETAIL

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2009-10-29
MP



SECTION A-A D5-2
SCALE 4X

DESIGN	PH	DART AEROSPACE LTD
DRAWN	RF	HAWKSLEY, ONTARIO, CANADA
CHECKED	Q	REV. D
MFG. APPR.	DL	D212-664-141
APPROVED	MP	SHEET 2 OF 4
DE APPR.	HL	TITLE SCALE
DATE	09.09.30	XTUBE ASS'Y (205/212/412 HI FWD) NTS

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8 7 6 5 4 3 2 1

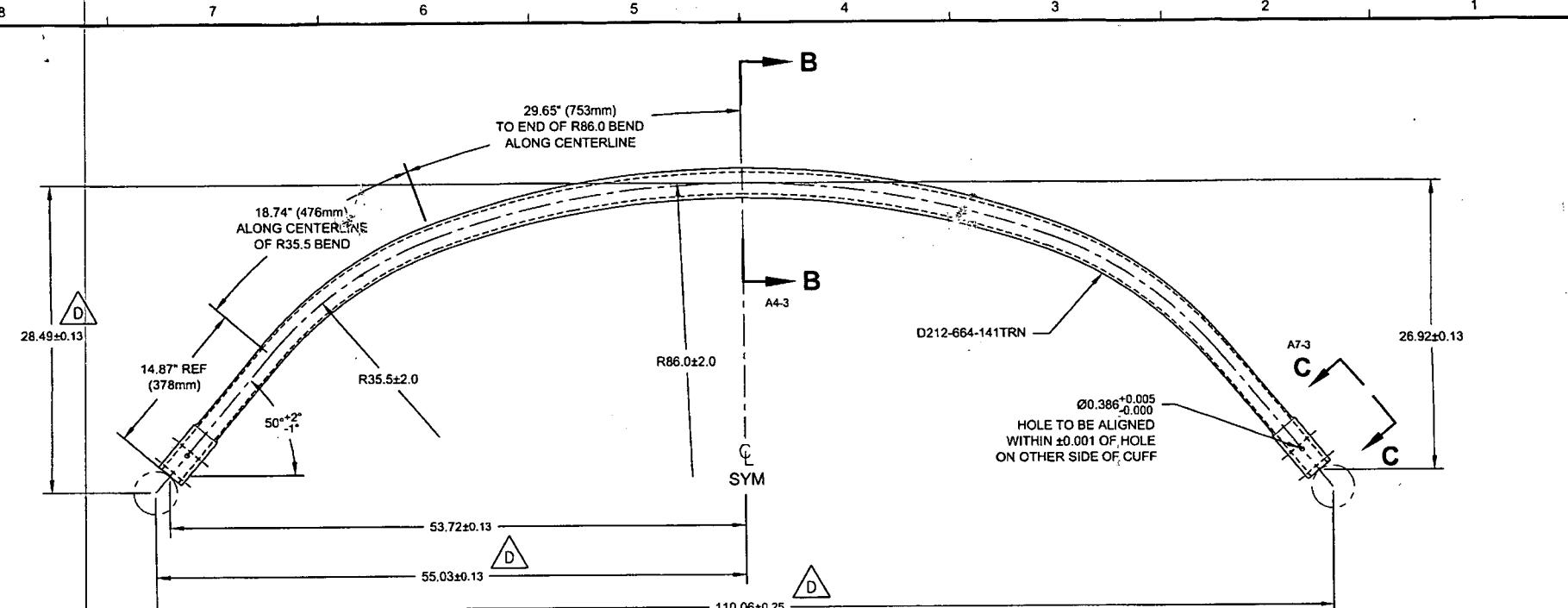
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

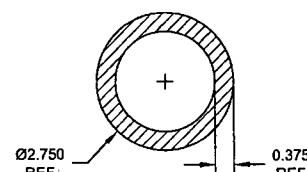
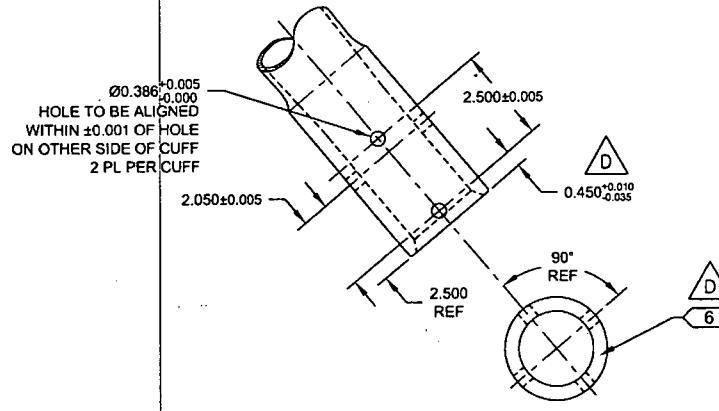
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-501
BENDING AND DRILLING DETAIL 10 → D



SECTION B-B C4-3
SCALE 4X

VIEW C-C: CUFF DETAIL C2-3
SCALE 3X

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W/0 54304

DESIGN	P4	DART AEROSPACE LTD
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CHECKED	Q	REV. D
MFG. APPR.	DK	DRAWING NO. D212-664-141
APPROVED	ND	SHEET 3 OF 4
DE APPR.	EF	TITLE XTUBE ASS'Y (205/212/412 HI FWD) NTS
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8 7 6 5 4 3 2 1

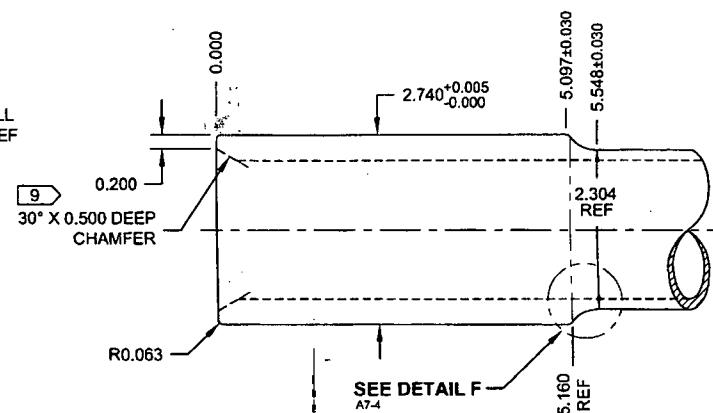
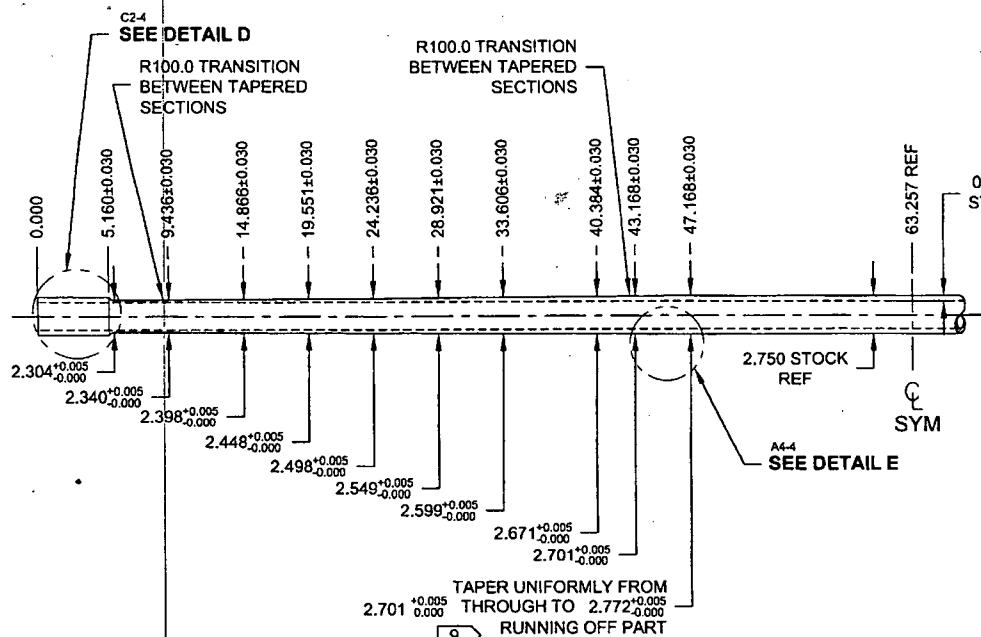
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

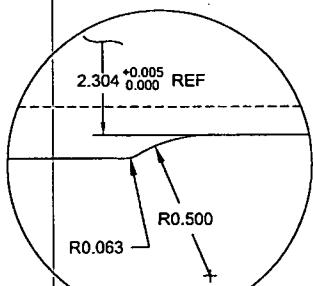
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

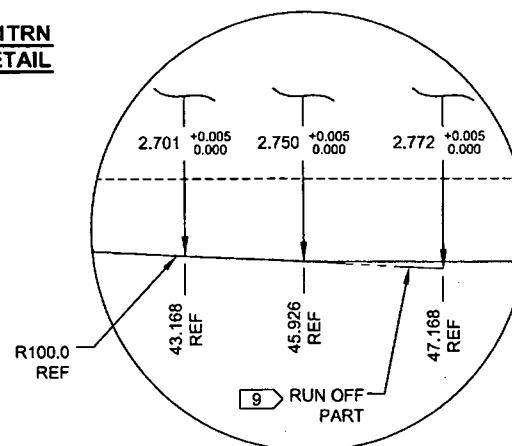
NOTE: Date & initial all entries



DETAIL D:
CROSSTUBE CUFF D8-4
SCALE 5X



DETAIL F:
CUFF TRANSITION C2-4
SCALE 10X



DETAIL E:
TAPER RUN-OFF C5-4
NOT TO SCALE

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2009-10-29

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DESIGN	PH	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	90	DRAWING NO.
MFG. APPR.	DA	D212-664-141
APPROVED	NP	REV. D
DE APPR.	HL	SHEET 4 OF 4
DATE	09.09.30	TITLE
		XTUBE ASS'Y (205/212/412 HI FWD) NTS

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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			D212-664-101	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
		X		D212-664-201	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
			X	D412-664-203	CROSSTUBE INSTALLATION, 412 HIGH AFT
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	/ 4			AN6-35A	BOLT
14	/ 4			AN6-36A	BOLT
15	/ 6			MS21042L6 ✓	NUT (OR MS21042-6)
16	/ 18			AN960JD616*	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
50	/ 1	/ 1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE
 NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
 SKIDTUBES.

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Revision: F
 Date: 08.09.05

Chris Provencal

From: David Shepherd [dshepherd@dartaero.com]

Sent: December 15, 2009 3:04 PM

To: 'Chris Provencal'

Subject: RE: Xtube with ridges

Chris,

As you suggest, bending the tube slightly overheight and trimming off the ends is probably the best solution.

David

From: Chris Provencal [mailto:cprovencal@dartaero.com]

Sent: Monday, December 14, 2009 2:24 PM

To: 'David Shepherd'

Subject: Xtube with ridges

David,

Sorting out some conflicting info... the tube with the ridges at the end of the cuffs is actually a 212 fwd (I verified the ID). I attached a sketch showing what it would look like with the holes (0.386 OD). I think that if we ensure the holes are drilled at max dim, it's not that bad structurally considering it only bears on that edge in the air. The only thing is that it just looks wrong to have a hole that close to a ridge.

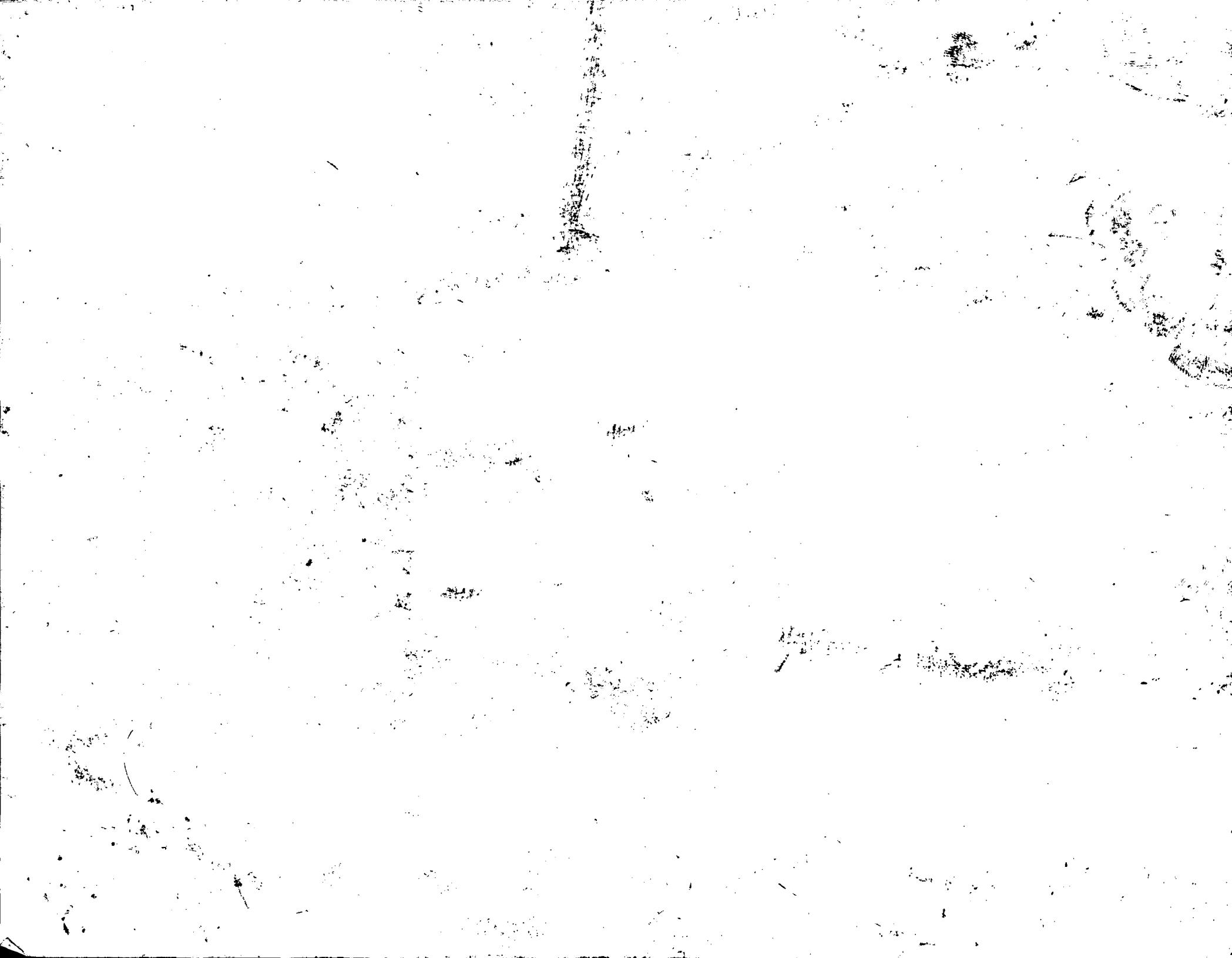
Alternately I could also tell them to try to bend it a bit high, and then cut off about 0.06"-0.10" before drilling the holes.

-Chris

No virus found in this incoming message.

Checked by AVG - www.avg.com

Version: 8.5.427 / Virus Database: 270.14.105/2562 - Release Date: 12/13/09 07:39:00





LIQUID PENETRANT TEST REPORT

P- 1531

PAGE 1 OF

CLIENT	DNT Aerospace		DATE	DEC 28 - 2003	TIME	AM	P
ATTENTION	LINDA / CHANTEL		ACUREN JOB NO.	188-09 - 001683			
ADDRESS	1270 ABERDEEN ST HAWKESBURY ON. K0M 1K7		PO/WO NO.	11012 -			
WORK LOCATION			ACCEPTANCE STD.	SOME			
PROJECT	F.P.I. on CROSS TUBES AND MACHINED PARTS		REV./DATE	ASTM 1417 DEC			
ITEM(S) EXAMINED	4 CROSS TUBES 11 MACHINED - STUDS. 2 COLLECTIVE BELL CLANK-W.O. 533						
JOB DESCRIPTION	PROCEDURE NO.	LTO002	REV./DATE	TECHNIQUE NO.	LTP002	REV./DATE	/
PART NO.	SYSTEM		MATERIAL	ALUMINUM ALLOY		THICKNESS	- 1/4"
SCOPE	WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON THE EXTERNAL						

TEST DETAILS								
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	10454	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMUL.	<input type="checkbox"/>	
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	4	<input type="checkbox"/> OUTPUT > 1000 μW/cm ²	<input type="checkbox"/> AMBIENT <	<input type="checkbox"/>	
PENETRANT	2107	MINIMUM DWELL TIME	45 10	MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ 5'
PENETRANT REMOVER	4-20	MINIMUM DRY TIME	>10	MIN.	OTHER	6431.00		
DEVELOPER	SKD 52	MINIMUM DWELL TIME	10	MIN.	LIGHT METER S/N	10488366	CAL DUE DATE	12/1
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY					

TEST SURFACE							
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE ME	<input type="checkbox"/>	<input type="checkbox"/>
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/20°F	<input type="checkbox"/> -4°C/20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F			

RESULTS-	<input type="checkbox"/> METRIC	<input checked="" type="checkbox"/> IMPERIAL
----------	---------------------------------	--

1	CROSSTUBE - W.O. 53341	✓	
1	CROSSTUBE W.O. 53342	✓	
1	CROSSTUBE - W.O. 54504	✓	
1	CROSSTUBE - W.O. 54503	✓	
11	STUDS - W.O. 50932	✓	
2	COLLECTIVE BELL CLANK W.O. 53635	✓	

M 10 01 04

Scope of Services
 The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as well as other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
 In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, express or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	Linda Lavelle	PRINT	SIGNATURE	DTR #	E-27647
TECHNICIAN (SIGNATURE):	Mike Johnson			REPORT REVIEWED BY:	
NAME (PRINT):				NAME	INIT
	1 ST TECHNICIAN	SNT LEVEL	2 ND TECHNICIAN		
CGSB LEVEL	S	X	CGSB LEVEL	SNT LEVEL	
CGSB REG. NO.	6066		CGSB REG. NO.		

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